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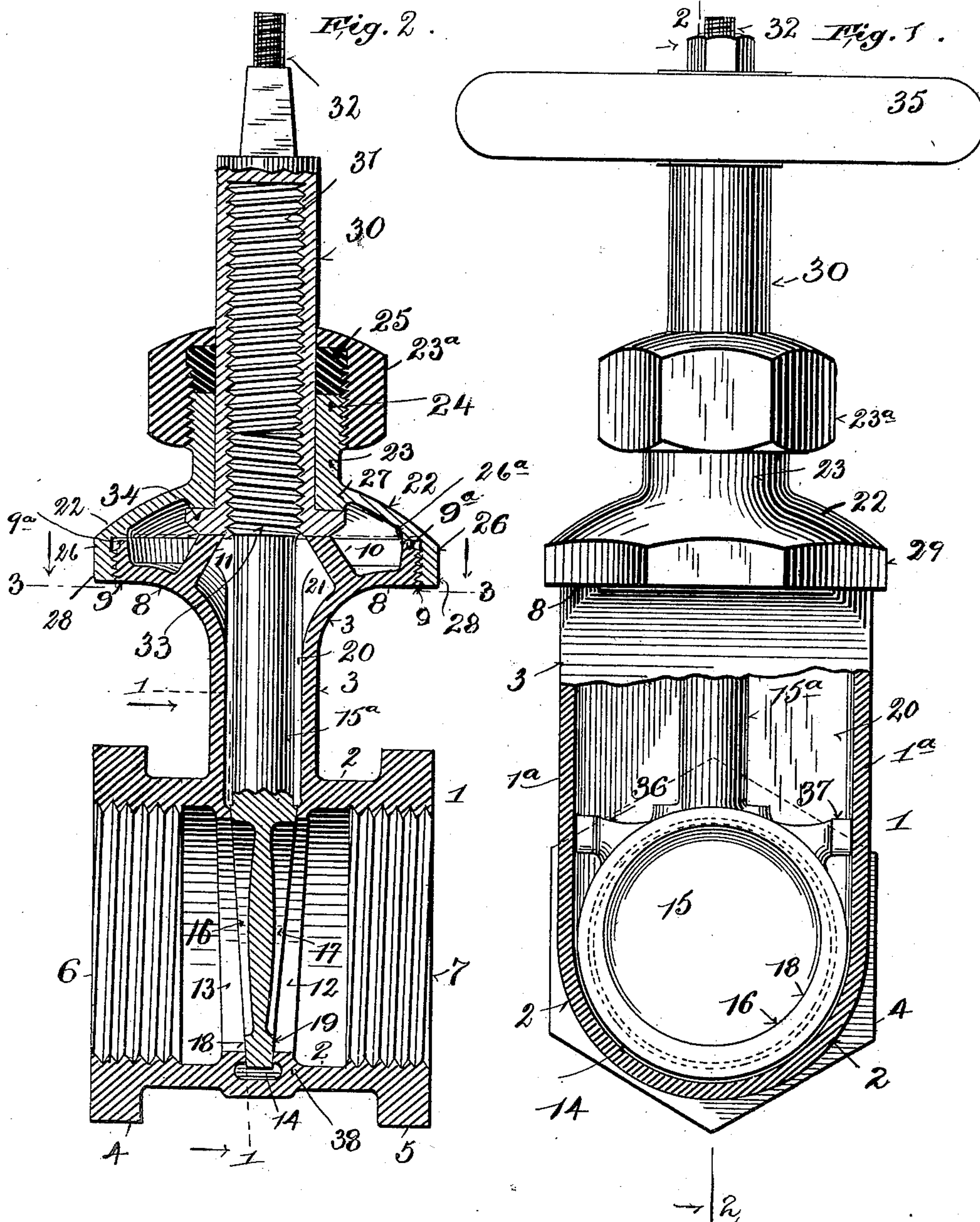
Patented Nov. 18, 1902.

A. W. CASH.
GATE VALVE.

(Application filed Apr. 7, 1902.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.
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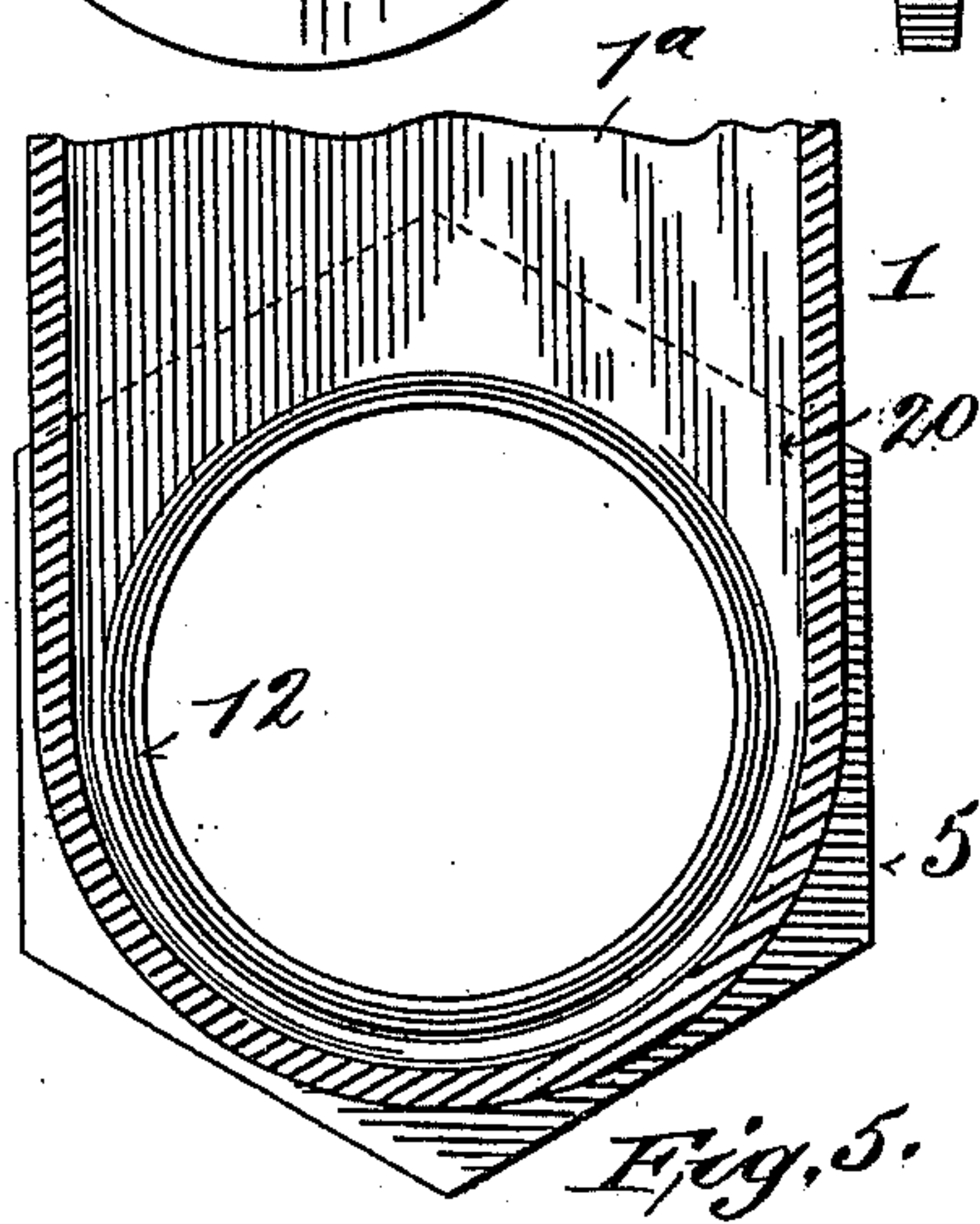
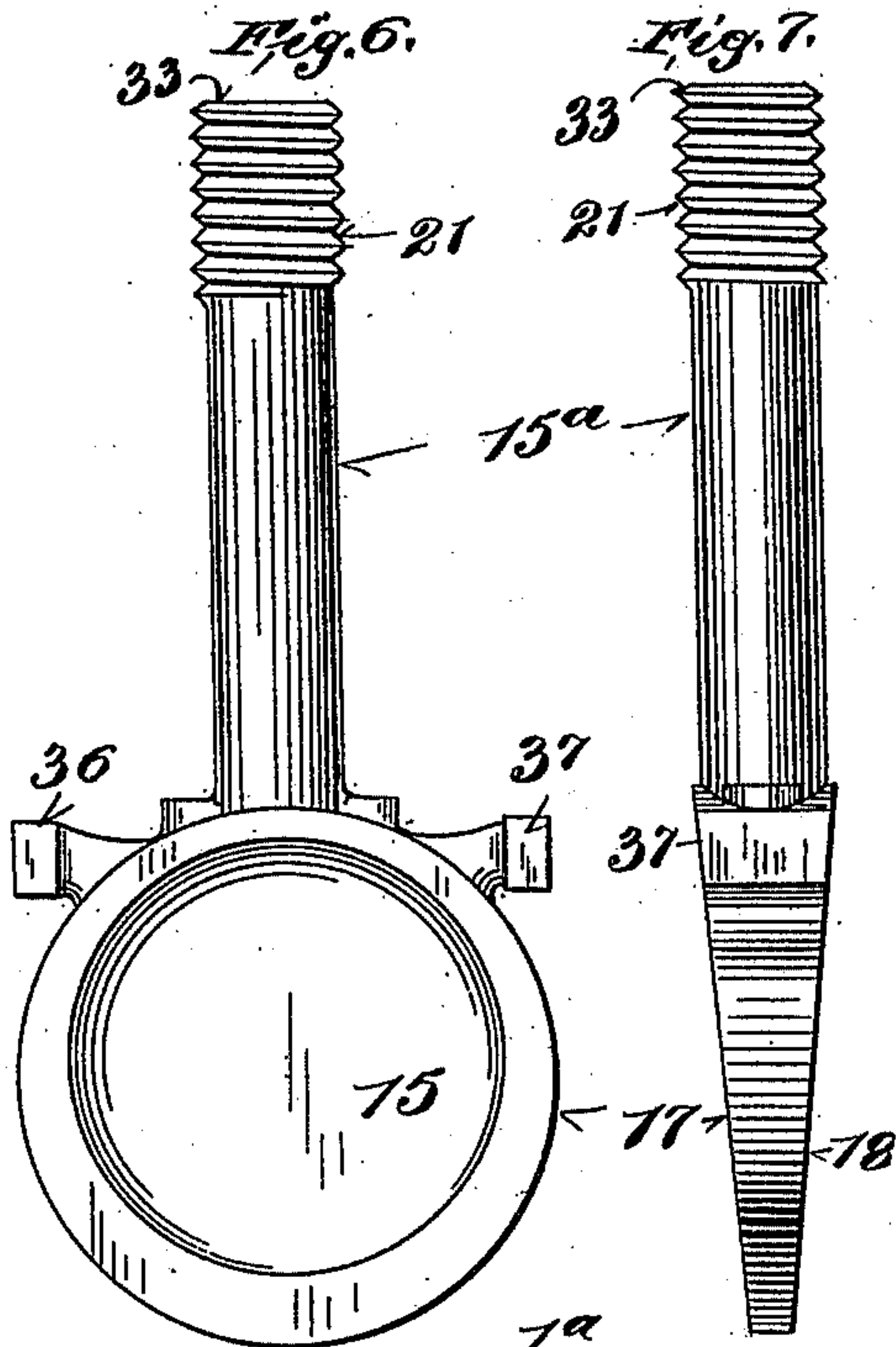
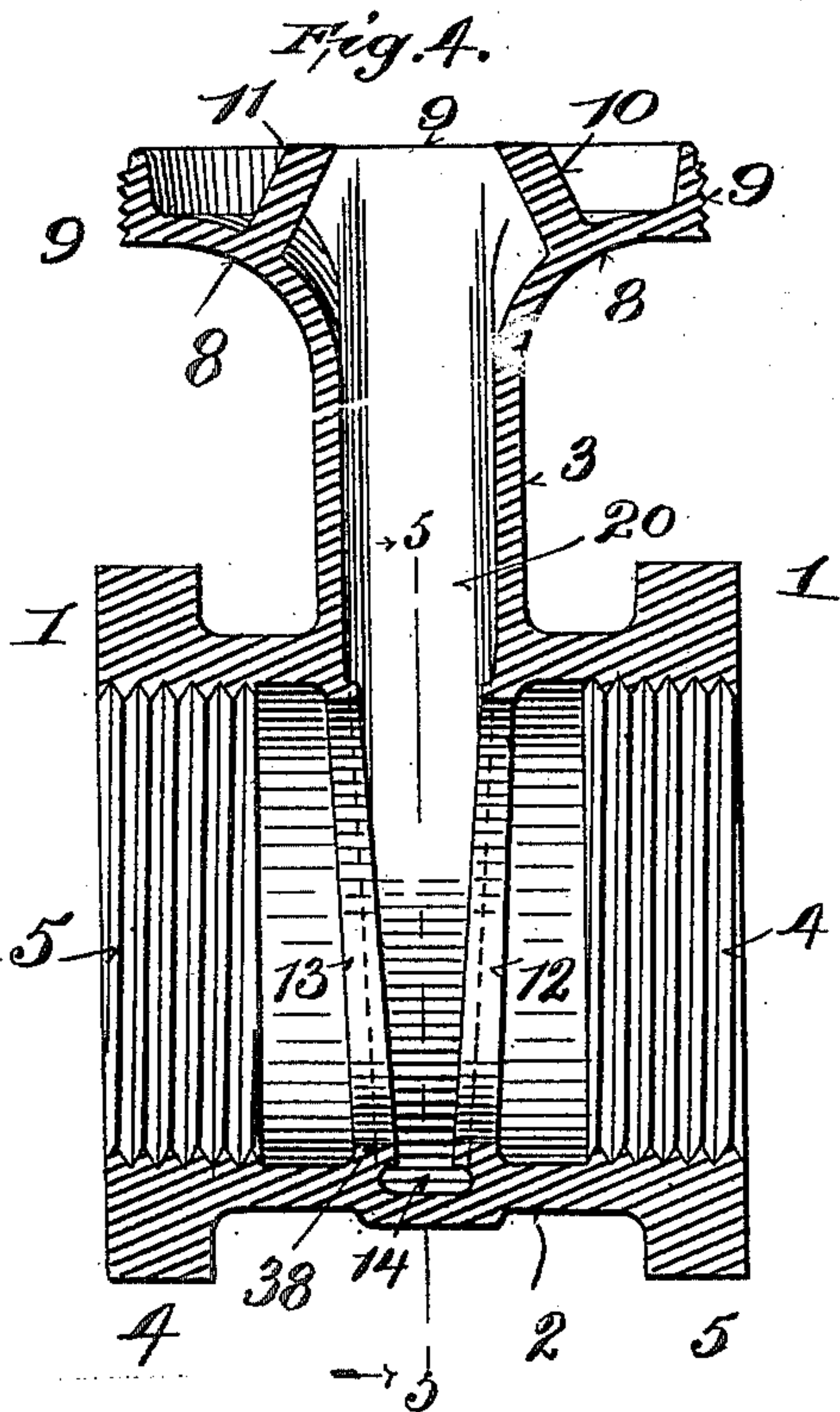
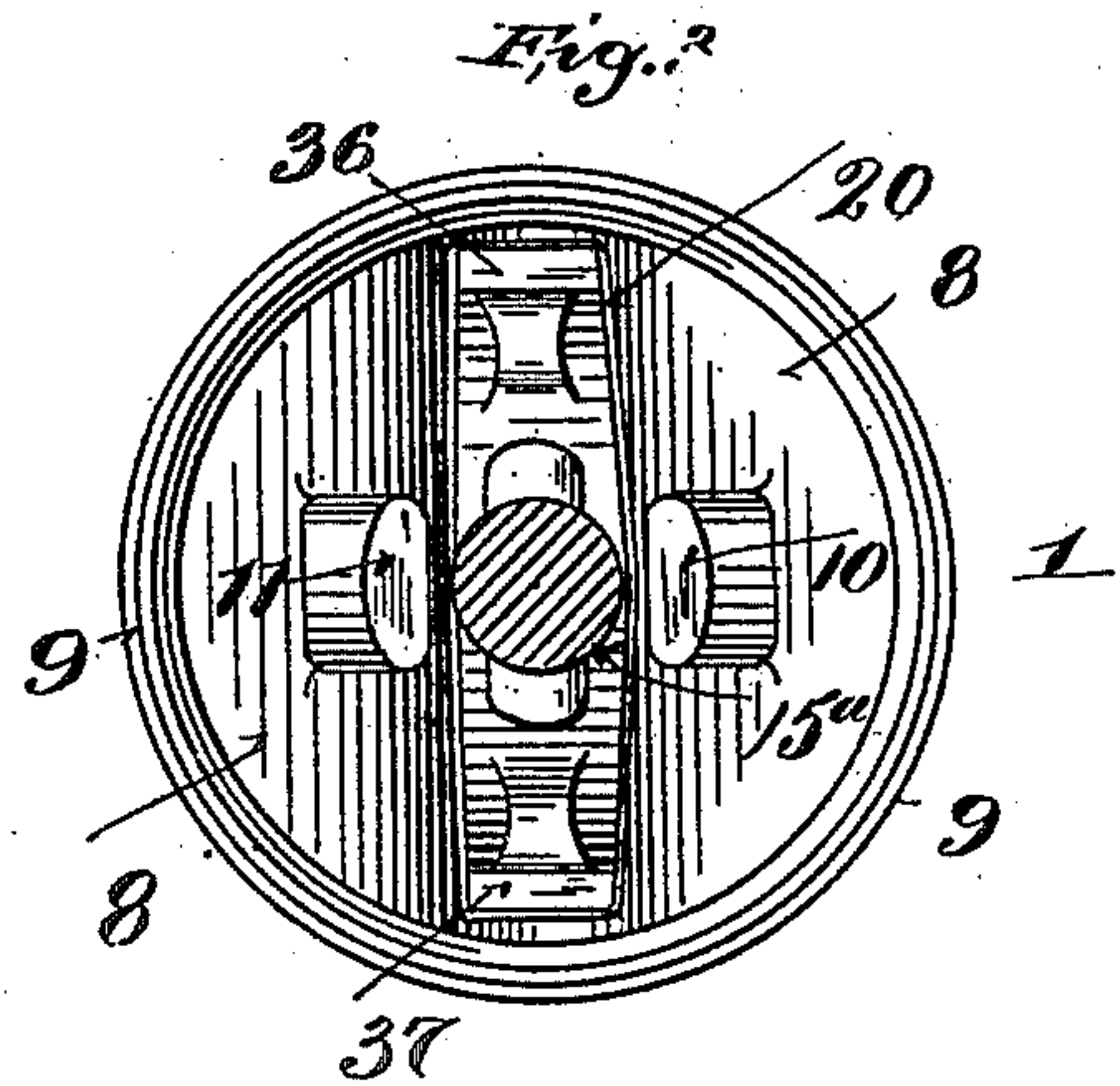
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UNITED STATES PATENT OFFICE.

ARTHUR W. CASH, OF NEWARK, NEW JERSEY.

GATE-VALVE.

SPECIFICATION forming part of Letters Patent No. 713,851, dated November 18, 1902.

Application filed April 7, 1902. Serial No. 101,731. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR W. CASH, a citizen of the United States, and a resident of Newark, county of Essex, and State of New Jersey, (and whose post-office address is 87 Sherman avenue, in said city,) have invented certain new and useful Improvements in Gate-Valves, of which the following is a specification.

My invention relates to valves for steam, water, gas, and the like; and it relates more specifically to that class of valves known as "gate-valves," wherein a direct and vertically acting gate for opening and closing the valveway is employed.

The object of my invention is to generally improve the construction of valves of this class; and its special object is to produce a certain and efficiently-operating valve and the reduction in the weight of the same for a given size (while maintaining the maximum valve-opening) and the reduction in the number of parts, a consequent saving in labor, and a considerable reduction in weight and mass of material employed, especially in the valve-casing and in the gate, thereby not only saving in the cost of material, which is a considerable item, but a considerable reduction of size is had, and necessary strength to resist pressure and operation is obtained by the construction and combination of parts entering into my improvements.

As compared with practical valves, so far as my knowledge extends, for a given size of valve, especially the intermediate sizes, the valve constructed in accordance with my invention is not only smaller, more compact longitudinally and transversely, lighter, consistent with resistance to internal pressures, and of greater resisting capacity even with a reduction of material, embodying less bulk of material—that is to say, involving a consolidation and reduction in the number of parts—is steadier under action, especially during whole or partial opening or closing of the gate, is more economical of manufacture, provides easier access to the packing, is easily assembled or disassembled, and generally possesses more or greater features of utility than any other valve known to me, a given size and weight for weight being considered.

My invention consists in the novel con-

structions and combinations of parts hereinafter described, and finally pointed out in the claims.

In the drawings forming part of this specification, Figure 1 is an end elevation, partly in section, showing the interior of the valve. Fig. 2 is a vertical longitudinal sectional elevation of the same, substantially on the line 2 2, Fig. 1. Fig. 3 is a sectional view taken along the line 3 3, Fig. 2. Fig. 4 is a transverse section substantially on the line 2 2, Fig. 1, showing the gate and the stem removed. Fig. 5 is a transverse section substantially on the line 5 5, Fig. 4. Fig. 6 is a front elevation of the gate and its stem. Fig. 7 is a side elevation of the gate and its stem.

In accordance with the illustrated embodiment of the several features of my invention the numeral 1 generically indicates the valve-casing, of which 2 is the horizontal section and 3 the upright section. The entire casing is condensed or contracted longitudinally—that is, in the direction of the longitudinal axis of the lower section or barrel 2, which latter has the usual flanges 4 5 and interior coupling-threads 6 7. The vertical section 3 of the casing is also considerably contracted—that is, laterally, as shown—and above the contracted portion it is laterally expanded and provided with an outwardly-flaring circular flange 8, having an annular and upwardly extending flange 9, exteriorly screw-threaded and terminating in an annular rim 9^a, lugs 10 11 being formed on the flange 8, converging upwardly and inwardly.

The gate-seat comprises the two circular flanges 12 13, converging downwardly, about which the metal of the barrel is flared to form a groove 14. The gate 15, which is imperforate, and its stem 15^a are made in one piece, the gate having circular flanges 16 17, converging downwardly to form a wedge-shaped gate, the faces 18 19 of the flanges being ground to bear against the faces of the gate-seats 12 13, as illustrated in Fig. 2.

It will be noted that the two circular flanges 12 13, comprising the valve-seat generically numbered 38, form an outwardly-projecting seat adapted to tightly receive the solid wedge-shaped gate 15 and with the upper portions of the seat is substantially coextensive and continuous with the side walls 1^a 1^a

of the upright section 3 of the casing, while the lower portion of the seat, including the channel 14, leading to the bore 20, in the upper section of the casing, are not only laterally contracted relatively to the like dimension of the upper casing-section, but are—that is, with special reference to the operative faces of the valve-seat up to the top thereof—considerably smaller than the gate-stem 15^a, while the gate 15 itself, so far as a transverse dimension of the operative seating-faces is concerned, from the lower edges, approximately its union with the stem, is very much smaller than the diameter of the gate-stem.

As illustrated, the stem 15^a and the gate 15 are formed integrally—that is, in one piece of material—with an external thread 21 formed at the top. So far as this feature of my invention is concerned, I do not limit myself to forming the stem and the gate in one piece of metal, as they may be made in separate parts and mechanically joined, but I prefer that they be made, as illustrated, integrally with each other.

Following out my idea of compactness the gate is made imperforate, as distinguished from the prior wedge-shaped shells having valve-stems extending therefrom, such shells forming gates made up of movable sections carried by the shell.

The operative portion of the valve or gate 15 is capable of being made of the same lateral diameter and even of considerably less thickness at its thickest part than the valve or gate stem.

As will be observed, the gate 15 is supported against rattling or lateral movement by means of the firm connection of its stem to the spindle 30 and with the valve-casing 1 at the upper portion of the stem 15^a, and by the ears 36 37 on the gate 15, so that all its movements—viz., when the gate is either wholly or partly disengaged from its seat 38, which steadies it when the former is completely moved home—are completely under control, thereby doing away with the rattling incidental to other valve structures where the gate or valve is improperly or insufficiently supported. The thrust-flange 34, resting upon the lugs 10 11, supports the weight of the valve or gate 15 and its operating-stem 15^a when the valve is being raised. When being lowered into the seat 38 or pressed home, any upward stress which may develop is taken up by the contact of the thrust-flange 34 with the interior shoulder or seat 27. Thus the valve is not only steadied in all of its movements, but the strain imposed by the spindle 30, due to the operation of the valve, is taken up directly by the valve-casing instead of by a portion of the packing or gland, and the spindle is confined against vertical movement in either direction between the seat 27 and the lugs 10 11, the flange seating itself against the seat 27, which parts may be slightly ground to make a substantial fit.

Packing the joint while under pressure

may be accomplished by screwing down the spindle 30, which will cause the flange 34 to bear more or less upon the adjacent surface 70 of the shoulder 27 of the hood 22. This not only adds to the packing of the joint, but enables the packing-nut 23^a to be removed for the purpose of inserting or manipulating the packing.

At 22 is the hood, comprising the annular and exteriorly-threaded barrel portion 23, receiving the packing-nut 23^a, the upper annular rim 24 of which receives the packing 25. From the barrel or hub the body of the hood extends or diverges outwardly, is circular in plan, has an annular depending flange 26, an interior seat 26^a, and an annular shoulder 27 at the base of the hub, the flange 26 being interiorly threaded to engage the exterior thread on the flange 9 of the casing, the seat 26^a bearing on the top of the rim 9^a, making a sealed joint in the hood and reducing its interior area subject to pressure, the outer surface 28 of the hood-flange 26 being squared to form a nut 29.

By reference to Fig. 2 it will be noted that the hood 22 has considerable lateral dimensions, it being exteriorly substantially of the same diameter as the distance through the lower section 2 of the valve-casing, although these dimensions are not absolutely essential.

The circular and laterally-expanded hood 22, secured upon the exterior of the laterally-expanded section 8 of the laterally-contracted portion 3 of the valve-casing, not only permits of the lower portion of the valve-casing to be laterally contracted, even to the extent of making it of substantially the same diameter transversely as the gate-stem 15^a and regulated thereby, but provides means whereby the pressure within the casing—that is, the tendency of the same to expand under pressure—is taken up by the hood 22, which, if not wholly, materially relieves the horizontal section 2 and the upper casing-section 3 of the strain due to pressure. I am therefore enabled to laterally condense or compact the parts with the consequent result previously recited and obtain a maximum of strength, a minimum of weight or mass of material, and a considerable reduction in dimension.

At 30 is the valve-stem spindle, having an interiorly-threaded bore 31 to receive the thread on the upper end 33 of the gate-stem 15^a, into which bore the said stem is adapted to enter and emerge, and a transversely-extending annular flange or thrust-disk 34, which rests upon the inwardly-extending lugs 10 11, the upper surface of which bears against the lower surface of the flange 34, the upper exterior end of the spindle 31 being closed and provided with a lug 22, on which the operating-wheel 35 is fastened.

At 36 37 are ears formed on the side of the gate, which are adapted to play up and down in the upper section 3 of the valve-casing 1, the side walls 1^a 1^a of the latter acting as a

guide therefor—that is, the ears project into the narrow passage 20 at all positions of the movement of the gate up and down.

While I prefer that the lateral diameter of the valve-casing 1 be substantially that of the thickness of the ears 36 37, so that they may fit snugly therein, allowance for a slight movement laterally of the ears in the guideway 20 thus formed may be provided by increasing the diameter of the guideway 20 relative to the ears.

From the foregoing it will be apparent that my invention is susceptible of considerable modification without departing from the spirit thereof.

Having described my invention, I claim—

1. In a valve, a valve-casing, having valve-seats formed therein, a contracted vertical extension formed integrally with and having a lateral internal diameter equal to the internal diameter of the casing and a pair of lugs provided upon the upper portion of said vertical extension adapted to receive and retain a spindle for operating and supporting the stem and gate.

2. In a gate-valve, a casing comprising a main casing having a pair of divergent valve-seats formed therein, a flattened vertical extension formed integrally with said main casing, the internal space of which is a continuation of the space formed about said valve-seats of said casing, an externally-screw-threaded head formed upon the top of said vertical extension, and lugs formed in said head provided with bearing surfaces or seats upon their upper ends adapted to receive and retain a spindle for operating and supporting a stem and gate movable between the seats of said casing.

3. In a gate-valve, the combination with the valve-casing having a pair of divergent valve-seats formed therein, a flattened vertical extension formed integrally with and forming part of said valve-casing, an externally-screw-threaded head formed upon the top of said vertical extension, lugs formed upon said extension adjacent said head, a perforated head or cap screw threaded upon said head, an internally-screw-threaded spindle, passing through the perforation in said cap, and resting upon and retained by said lugs.

4. In a gate-valve, the combination with the main valve-casing having a pair of divergent valve-seats formed therein, and a flattened vertical extension formed integrally with said main casing; of a valve with an integral screw-threaded stem carried in said extension and adapted to seat itself between said valve-seats in said main casing, an apertured cap fitting over the externally-screw-threaded head of said extension, an internally-thread-

ed spindle passing through the aperture in said cap adapted to raise and lower said valve and stem, and lugs formed in said extension upon which said spindle is supported.

5. In a gate-valve, the combination with the main valve-casing having a pair of divergent valve-seats formed therein and a flattened vertical extension formed integrally with said main casing; of a valve with integral screw-threaded stem carried in said extension adapted to seat itself between said valve-seats in said main casing, means for guiding said valve in said vertical extension, an apertured cap fitting over the head of said extension, an internally-threaded spindle passing through the aperture in said cap adapted to raise and lower the said valve and stem and lugs formed in said extension upon which said spindle is supported.

6. In a gate-valve, the combination with the main valve-casing having a pair of divergent valve-seats formed therein and a flattened vertical extension formed integrally with said main casing; of a valve with an integral and externally-threaded stem carried in said extension adapted to seat itself between said valve-seats in said main casing, extensions carried by said valve adapted to guide said valve between said valve-seats, an apertured cap fitting over the head of said extension, an internally-threaded spindle passing through the aperture in said cap adapted to support and operate said valve and stem, and lugs formed in said vertical extension by which said spindle is supported and retained.

7. In a gate-valve, the combination with the main valve-casing having divergent valve-seats formed therein, a flattened vertical extension formed integrally with said main casing and an externally-screw-threaded head formed upon the top of said extension being a continuation of and having the same dimensions as the space formed about the valve-seats in said main casing; of a wedge-shaped valve carried in said extension and adapted to fit between said valve-seats, a screw-threaded integral stem carried by said valve, and an internally-screw-threaded spindle fitting over said stem, having a flange upon the lower end, a screw-threaded cap fitting over the head upon said vertical extension of the casing, a pair of lugs formed upon said extension, and a seat formed in said cap adapted to retain said flange against said lugs.

Signed in the city, county, and State of New York this 4th day of April, 1902.

ARTHUR W. CASH.

Witnesses:

CHAS. G. HENSLEY,
SOPHIE SEKOSTY.